REMARKS

Claims 1-32 are pending. The drawings have been amended. The specification has been amended. Claims 1, 4, 6-11, 13, 15-17, 21-28, and 31-32 have been amended. The Abstract of the disclosure has been amended. No new matter has been added by way of this amendment. Reconsideration of the application is respectfully requested.

The drawings have been objected to for various reasons, including failing to comply with 37 C.F. R. 1.83(a). According to the Examiner, "it is unclear why the x-axis of graphs 'G', 'J', 'O', and 'P' are labeled both 'Impedance' and 'Resonance Frequency'" and "because they do not include the following reference sign(s) mentioned in the description: '15', '17', and '20'" and "because they include the following reference sign(s) not mentioned in the description: '18', '19', '71', '72', '74', '76', '80', '82', '84', '96', '110', '112', '114', '142', '144', '146', '750', '770', '860', '880'." In response to these several objections, Applicants have amended the drawings to address each specific objection. Accordingly, reconsideration and withdrawal of the objection are respectfully requested.

The Abstract of the disclosure has been objected to because its length exceeds the 150-word limit. In response to this objection, Applicants have amended the Abstract of the disclosure such that it is now within the required word limit.

The disclosure of the objection has been objected to by the Examiner. According to the Examiner, "[o]n page 11, lines 27-28, it is unclear what it means to 'show values that are exemplify a particular US system.'" In addition, "on page 17, line 2, Applicant refers to '104' as a line while

6b shows '104' as 'Phase Detection Logic'." In response to these objections, Applicants have amended the specification to clarify the unclear sentence, and the drawings have been amended to change line "104" to line --106--. Accordingly, reconsideration and withdrawal of the objections are respectfully requested.

Claims 1, 6, 9, 10, 13, 15, 17, 21, 22, 24, 25, 26, 28, and 31 have been objected to by the Examiner. In response to the objections, Applicants have amended the claims in a manner which is believed to resolve each specific objection. Accordingly, reconsideration and withdrawal of the objections are respectfully requested.

Claims 6-32 stands rejected under 35 U.S.C. §112, 2nd ¶, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 6, the Examiner has stated that this claim is indefinite because it recites a limitation for "evaluation of a continuousness of the data obtained". In response to this rejection, Applicants respectfully assert that the evaluation is of all the data that is obtained, i.e., the "lowest impedance", the "maximum phase", and the "blade resonance frequency". As a result, Applicants respectfully assert that this claim is clear.

Regarding claims 13, 14, and 30, the Examiner has stated that the limitation "calculating differences between impedance magnitudes" is unclear because it is not clear to which

magnitudes the limitation is referring. In response to this rejection, the following is noted, the claim limitation establishes two comparisons which are performed. In this case, the differences of the impedance magnitudes are the comparisons that are performed between the "minimum impedance magnitude" and the "minimum impedance magnitude obtained at a higher excitation level," as well as the "minimum unchanged impedance magnitude" and the "minimum impedance which is higher than the minimum impedance magnitude obtained at the higher excitation level." Accordingly, Applicants respectfully assert that the claim limitations are clear.

Where appropriate, Applicants have amended the claims in a manner which is believed to address each specific rejection set forth in the Office Action. Accordingly, Applicants now believe that the claims are definite and therefore, reconsideration and withdrawal of all the rejections under 35 U.S.C. §112, 2nd ¶ are respectfully requested.

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,042,460 to *Sakurai* et al., while claims 2, 4, 6, 17, 18, 20, and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the *Sakurai* et al. reference in view of JP Patent No. 06-003305 to *Senda* et al. In addition, claims 3, 5, 19, and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the *Sakurai* et al. patent in view of the *Senda* et al. reference, and further in view of U.S. Patent No. 6,019,775 to *Sakurai*. In response to these several grounds of rejection, Applicants have amended independent claims 1 and 17 to emphasize those features of the invention that distinguish it from the cited reference. Accordingly, for the reasons set forth hereafter, Applicants respectfully submit that all claims of record now distinguish over the cited references.

Claims 1 and 17 have been amended to recite the step of "obtaining magnitude impedance data and impedance phase data for the hand piece/blade."

U.S. Patent No. 5,042,460 to *Sakurai* et al. relates to an ultrasonic apparatus which includes an impedance detection unit for detecting the impedance of an ultrasonic vibration element which is used for transmitting ultrasonic vibrations, and a determining unit for determining whether the ultrasonic vibration element is good. According to this patent, if the ultrasonic vibration element is found to be bad, then a control unit inhibits the ultrasonic vibration element from generating ultrasonic vibrations. In this manner, it becomes possible to prevent any breakage of the apparatus (see Abs.). However, the *Sakurai* et al. patent fails to teach the present invention as set forth in amended claims 1 and 17. Specifically, *Sakurai* et al. fail to teach the step of obtaining magnitude impedance data and impedance phase data for a hand piece/blade.

Set forth on page 10, paragraph 16 thru page 11 of the Office Action is the statement:

> "Senda teaches a method for non-destructively inspecting a piezoelectric element for a micro-crack comprising obtaining impedance data for a known/ideal element (0013, lines 1-4) applying a drive signal for exciting the piezoelectric element over a predetermined frequency range and obtaining impedance magnitude and impedance phase data of the tested element (0021, lines 1-13), at a plurality current and voltage excitation levels (0010), and comparing the impedance of the element under test to the known element impedance data to determine the correctness of operation (0021, line 13 to 0022, line 7 and 0028). Senda also teaches comparing a magnitude of a lowest impedance (i.e. impedance at resonance) (0019) to the expected waveform to determine non-linearity (0010, 0025, and 0028).
>
> It would have been obvious to one having ordinary skill in the art to modify the invention of Sakurai to teach a method for determining a crack in the device as compared to a known/ideal device, as taught by Senda, because the combination would have provided a method for determining the occurrence of a physical defect thereby allowing the user to correctly diagnose

> and correct the problem and, as suggested by Senda, provided precise diagnostics quickly, automatically, and without destroying the device under test (0005-0007).

With respect to the foregoing, however, the following is noted. JP Patent No. 06-003305 to *Senda* et al. relates to a method for non-destructively inspecting piezo-electric elements for micro-cracks for a quick, automatic discrimination of the presence/absence of micro-cracks in a piezo-electric element with a high level of accuracy (see Purpose Statement of the patent abstract). According to this patent abstract, the frequency characteristics of the phase difference (phase angle) between the frequency characteristic and/or voltage and current of the impedance of a piezo-electric element is measured and the drive curve pattern indicating the measured frequency characteristic is measured. In addition, a curve pattern indicating the measured frequency characteristic is compared with the curve pattern of an element that is used as a reference. When both curve patterns are different from each other, it becomes possible to determine that micro-cracks exist in the element (see Constitution of the patent abstract).

In contrast, the calculation of phase data in the present claimed invention involves the calculation of impedance phase for the hand piece/blade which is determined by calculating the difference in frequency of the anti-resonance (i.e., the frequency with maximum impedance) and the resonance (i.e., the frequency with minimum frequency). This aspect of the invention is set forth on page 13, lines 4-10 of the specification. In the *Senda* et al. reference, the phase that is measured is the difference between the frequency characteristic and/or voltage and current of the impedance of a piezo-electric element. This is a different measurement than the impedance phase measurement set forth and claimed in independent claims 1 and 17, which is based on values at maximum and minimum resonance frequencies. It therefore follows that the combination of the *Sakurai* et al.

patent and the *Senda* et al. reference fails to teach or suggest the step of "obtaining magnitude impedance data and impedance phase data for the hand piece/blade," as set forth and claimed in the present invention.

U.S. Patent No. 6,019,775 to *Sakurai* relates to an ultrasonic apparatus which performs treatments by utilizing an ultrasonic oscillation, and comprises a handpiece serving as a surgical tool and an apparatus body including a power source unit for supplying electric power to the handpiece (see Abs.). However, this patent fails to cure the deficiency of the system comprising the *Sakurai* et al. patent and the *Senda* et al. reference. Specifically, *Sakurai* also fails to teach the step of "obtaining magnitude impedance data and impedance phase data for a hand piece/blade." In view of the foregoing, Applicants respectfully assert that the combined references, whether considered individually or in combination, fail to teach or suggest the invention as set forth in amended independent claims 1 and 17. Accordingly, independent claims 1 and 17 are patentable over the combination of the *Sakurai* patents and the *Senda* et al. reference.

In view of the patentability of amended independent claims 1 and 17, for the reasons above, dependent claims 2-16 and 18-32 are also patentable over the prior art.

In light of the foregoing amendments and remarks, this application should be in condition for allowance. Early passage of this case to issue is respectfully requested. However, if there are any questions regarding this Response, or the application in general, a telephone call to the undersigned would be appreciated since this would expedite the prosecution of the application for all concerned.

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Respectfully submitted,

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